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AJNR

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M. Castillo, M. Northam and K.E. Halm

AJNR Am J Neuroradiol published online 29 March 2012
<http://www.ajnr.org/content/early/2012/03/29/ajnr.A3026>

This information is current as of April 19, 2024.

ORIGINAL
RESEARCHM. Castillo
M. Northam
K.E. Halm

Postpublication Errors in Imaging-Related Journals

BACKGROUND AND PURPOSE: Assessment of postpublication errors in peer-reviewed journals is difficult and the numbers and types are unknown. We reviewed published errata in major clinical imaging journals in an attempt to understand the numbers and sources of errors in published articles.

MATERIALS AND METHODS: Five clinical imaging journals with the highest IFs were searched on-line using the terms "erratum" or "errata" anywhere in the title, abstract, or author listing for a total of 5 years. Each erratum was reviewed and categorized by type and source of responsibility.

RESULTS: The following journals were assessed: *JNM*, *Radiology*, *AJNR*, *AJR*, and *RadioGraphics*. There were a total of 158 total errata and each was placed in 1 of the following categories: typographical (94), factual (6), image-related (48), statistical calculation (7), or serious foundational errors (3). Errata were also labeled as author (107) or journal responsibility (51). One hundred forty-eight errata were categorized as minor (typographical, factual, and image-related) and 10 as major (statistical calculation, foundational errors).

CONCLUSIONS: Analysis of the 8910 articles published by the 5 journals during the study period, revealed the number of minor and major errors were few, 1.66% and 0.11%, respectively. Of these errors, 93.7% were considered minor and 6.3% major. Most major errors were judged to be the responsibility of the authors, whereas most minor ones were the responsibility of the journals.

ABBREVIATIONS: *AJNR* = American Journal of Neuroradiology; *AJR* = American Journal of Roentgenology; IF = Impact Factor; ISI = Institute for Scientific Information; *JAMA* = Journal of the American Medical Association; *JNM* = Journal of Nuclear Medicine; NLM = National Library of Medicine

It is known that high-impact journals contain fewer mistakes than low-impact ones but are not completely free of errors.¹ One of the most common errors in the scientific literature is the misspelling of author names.² Despite this, only approximately 20% of authors take steps to correct these errors and the time to correction is shorter in journals with the highest IFs. Overall corrections are also more common in articles that are eventually retracted from the literature than in those that remain valid and within data bases.³ It seems that journals with the highest IF contain fewer errors, but the numbers and types are unknown, particularly in the imaging-related literature. For this article, we sought to quantify and qualify postpublication errors, as evidenced by published errata, in clinical imaging journals with high IFs.

Materials and Methods

Through our medical school library subscription, we accessed the Journal Citation Reports from the ISI Web of Science⁴ to determine the 5 clinical imaging journals with the highest 2010 IFs. We did not include journals that emphasize basic research. We then accessed the Web site of each journal and, using the advanced search mode, searched for the terms "erratum" and/or "errata" anywhere in the title of the articles, abstracts, and/or author listings for a 5-year period from June 2006 to June 2011. Each item found was entered into a data base and a copy of its PDF version was also archived. Two radiologists

then carefully read each item and correlated it with the article to which it referred and categorized each erratum by type and responsibility. Errata were divided as typographical (minor spelling mistakes in the text of the articles), factual (corrections to errors in facts that did not change the meaning or results of the article, errors in author listings, incorrectly cited references), image-related (mistakes in images [placement or orientation] and/or their legends and/or insufficient explanation of findings), statistical calculations, and/or serious foundational errors (mistakes that compromised the validity of the methods used or conclusions). We then grouped these errata as minor (typographical, factual, and image-related) or major (statistical calculations and foundational errors). Types of responsibility for the errata were labeled as the belonging to the authors or to the journal in which the articles appeared. We then calculated the percentage for each of these findings for each of the journals assessed. Using the Journal Citation Reports, we also found the total number of articles published by each journal for a 5-year period and calculated the percentage of errata for total numbers of articles. We also correlated the types of errata with total number of articles published by each journal.

Results

The following journals were used for this study according their IF (from highest to lowest): *JNM* (IF = 7.022), *Radiology* (6.066), *AJNR* (3.464), *AJR* (2.797), and *RadioGraphics* (2.760). The 5-year search yielded a total of 158 errata that were categorized as follows, according to their types: typographical ($n = 94$), factual ($n = 6$), image-related ($n = 48$), statistical calculation ($n = 7$), and serious foundational errors ($n = 3$). With respect to responsibility for the errata, these were categorized as author responsibility ($n = 107$) or journal responsibility ($n = 51$). The total numbers of errata per journal were as follows: *JNM* ($n = 49$), *Radiology* ($n = 42$),

Received October 20, 2011; accepted after revision December 7.

From the Department of Radiology (M.C., M.N.), University of North Carolina School of Medicine, Chapel Hill, North Carolina; *American Journal of Neuroradiology* (K.E.H.), Oak Brook, Illinois.

Please address correspondence to M. Castillo, University of North Carolina, Department of Radiology, Campus Box 7510, Chapel Hill, NC 27599-7510; e-mail: castillo@med.unc.edu
<http://dx.doi.org/10.3174/ajnr.A3026>

AJNR ($n = 25$), *AJR* ($n = 20$), and *RadioGraphics* ($n = 22$). During the search period, the total numbers of articles published by each journal were as follows: *JNM* ($n = 1363$), *Radiology* ($n = 2022$), *AJNR* ($n = 1968$), *AJR* ($n = 2886$), and *RadioGraphics* ($n = 671$). The types of errata did not correlate with total numbers of articles published in each journal. The numbers of minor errors published by each journal were as follows: *JNM* ($n = 45$), *Radiology* ($n = 40$), *AJNR* ($n = 22$), *AJR* ($n = 19$), and *RadioGraphics* ($n = 22$). Errors considered as major published by each journal were as follows: *JNM* ($n = 4$), *Radiology* ($n = 2$), *AJNR* ($n = 3$), *AJR* ($n = 1$), and *RadioGraphics* ($n = 0$).

Discussion

The NLM considers all corrections or corrigenda (printer's mistakes) under the rubric of "errata."⁵ The NLM does not distinguish between errors arising from the publication process and those inherent to the manuscript, including study design. Since 1987, all of these are published as citable errata and the original articles are amended to reference those errata. Errata regarding author listings lead to the appropriate corrections of the original text, with an indication that the original citation field data have been amended. Major errata do not lead to creation of a new citation but are mentioned as a "published erratum," which is then identified with the header "erratum for." Substantial corrections, such as those pointed out in letters to the editor, will lead to the creation of a new citation in PubMed, but the original articles remain unchanged. If an article is changed, NLM keeps a copy of the original one.

It is very difficult to establish the rate of postpublication errors in scientific articles. Articles generally go through a rigorous peer review for most journals, including blinded evaluations by 2 or more reviewers, evaluation by at least 1 editor, and, after acceptance, revision of the proof by the authors, managing editors, journal editors, and redaction services. Thus, the number of errors after publication would be expected to be minimal. The exact number of postpublication errors is, however, not easy to establish and is unknown. Only major and significant errors leading to published errata can be quantified.

In this study, we sought to determine the number of postpublication errors, as evidenced by published errata in 5 major clinical imaging journals. We selected these journals based on their IF as determined by the Journal Citation Reports from the Web of Science. We chose a 5-year study period because in 3 journals (*Radiology*, *AJNR*, and *AJR*), the editors-in-chief have held that position for about that same period of time and the other 2 publications have been under the direction of 2 senior editors for the same time period. It is to be noted that because of the way ISI maintains its data base for calculation of the IF, these numbers vary by 6 months (earlier) from the period of the errata search. We believe that this does not affect our results and gives us a good estimate as to the number of published articles.

For a total of 8910 articles published by all 5 journals in 5 years, there were only 158 (1.77%) total errata. The journal with the highest number of published articles was *AJR* and the one with the lowest was *RadioGraphics*. However, *AJR* had the overall lowest percentage of errata (0.69%), *RadioGraphics* the highest (3.28%), and both had the overall lowest percentages of major errors (0.03% and 0.0%, respec-

tively). Because *RadioGraphics* is an image-heavy journal, these observations reflect the fact that most errata involved the images and their legends. In addition, because the contents of *RadioGraphics* are educational and not scientific, the impact of errors contained in it is probably small. The other journals, in order of the highest numbers of errata to the lowest, were *JNM*, *Radiology*, and *AJNR*. There was no correlation between the types of errata and the total numbers of articles published in each journal. A possible caveat is the underestimation of errors because we did not include letters to the editors. However, in our experience, these letters generally communicate differences of opinions rather than pointing out mistakes. It is also possible that our search missed some mistakes, but we consider this unlikely. It is, however, impossible to quantify lesser errors that do not appear later as errata. In journals that publish articles ahead of print, errors may be corrected by issuing new electronic versions of those articles up to the time of final publication. This fact is generally recorded in the journal's Web site, but it is not reflected in literature searches that capture only errata issued after final publication of articles. These prepublication, nonindexed errata were not included in this study. It is to be pointed out that, in most publications, even the first on-line publication of an article is generally the "official" but not the final one, as it carries with it a digital object identifier number. Although the numbers of postpublication mistakes are very low for the 5 journals analyzed, there is still room for improvement. A search using the same criteria on the Web sites of the *New England Journal of Medicine*, *JAMA*, and *The Lancet* revealed only 4, 5, and 1 errata, respectively, for the same time period. As we migrate to postpublication review of articles on the World Wide Web or blog-sites, it is possible that more errors will be detected.

Publishing errata is not without cost to journals. It implies editing, formatting, and printing costs. Many journals now opt for transferring the costs to the authors of the original article because they are responsible for the errors. The journal *Stroke* charges US \$100 for each on-line and/or print erratum published.⁶

Conclusions

A total of 158 errors were identified in 8910 articles (1.77%). Nearly all of these were due to typographical errors and/or problems with images (wrong image, wrong legend, or insufficient explanation of findings). The percentage of major errors was only 0.11% among all 5 journals studied. Most major errors were judged to be author responsibilities, whereas those that were journal responsibilities were minor (typographical errors and problems with author listings). Although the real rate of mistakes in publications remains unknown, by analyzing errata that represent major errors, we conclude that significant errors in the journals reviewed are few.

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